

# CS112: Modal, Temporal, and Spatial Logic

Problem Set 1: Natural Deduction for Propositional Logic  
Instructor: James Pustejovsky

**Posted:** Wednesday, August 31, 2016  
**Due Date:** Wednesday, September 7, 2016  
Email answers to Nikhil and James

The following problems are taken from the Huth and Ryan's Exercises for Chapter 1, starting on page 78 of the book. Please read the directions for each question carefully!

For each proof, please follow the format given in the book, providing the following information for each line of your proof:

Proof Line	Formula	Rule with Lines Used
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You may only use the basic rules of natural deduction and the four derived rules found on page 27 of Huth and Ryan. If you want to use any other rules (for example, De Morgan's), you must supply an additional proof that shows why that rule can be used.

Partial credit will be given, so, if you're stuck on one of the proofs, try sketching out your strategy for doing the proof and do what you can. Good luck!

1. Paraphrases  
Exercise 1.1, problem 1(c, h, j) – **3 questions**
2. Conventions  
Exercise 1.1, problem 2(a) – **1 question**
3. Natural Deduction  
Exercise 1.2, problem 1(e, f, j, n) – **4 questions**  
Exercise 1.2, problem 2(c, f) – **2 questions**
4. EXTRA CREDIT  
Exercise 1.2, problem 9